1. Crixivan (indinavir sulfate) is an inhibitor of the human immunodeficiency virus (HIV) protease. Circle the chiral centers and then determine the number of possible stereoisomers that exist for Crixivan.

Since there are five stereocenters, theoretically \(2^5 = 32\) stereoisomers exist.

2. Assign the marked asymmetric centers with R or S designations

3. Draw the enantiomers and diastereomers for the following compounds and assign their configurations.
4. Draw S-glyceraldehyde using wedged and dashed lines:

5. Indicate the relationship of the following pairs of organic compounds as: constitutional isomers (Cl), enantiomers (E), diastereomers (D), meso (M) or identical (I).
6. How many possible stereoisomers do you expect for 2,4-dibromo-3-hydroxyhexanal? How many enantiomers and diastereomers will it have? Draw one enantiomer and one diastereomer.

Since there are five stereocenters and no planes of symmetry, \(2^5 = 32\) stereoisomers exist. An enantiomer is the mirror image, and a diastereomer is not the mirror image but has some configurations different than the original.

7. Can you draw an enantiomer for the molecule below? Why or why not? The compound is meso due to having a plane of symmetry. Meso compounds have no enantiomers.

8. Pretend you had a dream last night that you woke up in the world behind your mirror. Everything would be in a reflective state (i.e. its opposite configuration) of how it existed in our “real world”. You would not have changed, but everything in this alternative world would be the opposite of our world (all chiral centers of food and all enzymes would be opposite in that mirror world). Which molecules below could you still eat and utilize correctly in your body and which other ones would not be recognized by your body or which ones might even be dangerous? (For example, you would not be able to eat starches because your enzymes would not be able to digest starches with the opposite configurations.)

Vitamins:

Analgesics:

Fats (lipids):